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SELECTION OF EQUIPMENT FOR EQUIPMENT QUALIFICATION

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SELECTION OF EQUIPMENT FOR EQUIPMENT QUALIFICATION

A report prepared by K.C. Torr of Monserco Limited under contract to the Atomic Energy Control Board

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ABSTRACT

This report describes the methodology applied in selecting equipment in the special safety systems for equipment qualification in the CANDU 600 MW nuclear generating stations at Gentilly 2 and Point Lepreau. Included is an explanation of the selection procedure adopted and the rationale behind the criteria used in identifying the equipment.

The equipment items on the list have been grouped into three priority categories as a planning aid to AECB staff for a review of the qualification status of the special safety systems.

RÉSUMÉ

Le présent rapport décrit la méthodologie appliquée au choix du matériel des systèmes de sûreté spéciaux pour la certification du matériel des centrales électronucléaires CANDU de 600 MW à Gentilly 2 et Point Lepreau. Il explique aussi la procédure de sélection adoptée et la justification des critères utilisés pour identifier le matériel.

Les articles de la liste de matériel ont été groupés en trois catégories de priorité pour aider les agents de la CCEA à planifier la révision de l'état de certification des systèmes de sûreté spéciaux.

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A. INTRODUCTION

Equipment qualification (EQ) deals with the qualification of safety-related equipment for service operation conditions under all expected service conditions in nuclear power plants. Its fundamental objective is to prevent common cause failures of redundant equipment. To this end, before the start of the operating life of the plant, each item of procured safety-related equipment must be shown to be capable of performing its designated safety function(s) under the most extreme service conditions expected for that equipment. This may be done either by testing, operating experience, or analysis, or a combination of these methods. Thereafter, throughout the operating life of the nuclear power plant, all qualified equipment must be preserved in a condition such that its capability of performing those designated safety function(s) will always be reasonably assured, and not degraded by the effects of aging, or any other in-service factors.

Over the two past decades, research work into the many aspects of EQ has expanded our understanding of the complexities of performing this type of qualification, with the result that EQ programs on the newer plants are more extensive, and include more careful simulations of accident and post-accident conditions and aging effects, than was formerly practised. In the light of this advancement in EQ knowledge, there is some merit to reviewing the status of EQ in operating plants, to determine whether any upgrading is required to maintain adequate plant safety. This report arises out of such an initiative.

The essence of an overall plant EQ program is the generation and maintenance of evidence that the equipment needed to perform the basic safety functions will always operate as required when needed. A key element in an EQ program is the master equipment list by which control is maintained over which equipment must be qualified for operation under all service conditions (i.e. normal, upset, and postulated accident and post-accident conditions).

B. SCOPE AND PURPOSE

The objective of the study reported herein was to compile a list of equipment in the special safety systems that must be qualified in the CANDU 600 MW power plants at Gentilly-2 and Point Lepreau.

In CANDU plants, the special safety systems, and also some process systems, are credited with functional roles in the various postulated accident scenarios considered in the safety analysis. All qualified equipment that contributes to those safety roles should appear in the master equipment list. As not all CANDU plants are identical in design, each plant design will have its own unique master list of qualified equipment, although there may be some similarity between the various CANDU plants'

equipment lists.

The reason for performing this exercise is to collect information that might serve as a basis for a review of the EQ status of Gentilly 2 and Point Lepreau nuclear power plants. With the scope of the study being limited to the special safety systems and their support services, this report therefore provides information for a review of those systems only. The purpose of this report is to explain the rationale applied in developing the equipment list, which is contained in the Appendix.

C. DEFINITIONS

The following definitions apply to key words used in this report.

Equipment: An assembly of components designed and manufactured to perform specific functions. Examples of equipment are electric motors, valves, valve operators, instrumentation and control devices.

Components: Items from which the equipment is asembled, for example connectors, limit switches, seals, etc.

Support Services: The basic services, for example instrument air, electric power, cooling water, etc., required by the equipment for it to perform its designated safety role(s).

Distribution Network: The physical channels through which these services are supplied to the various equipment items. The networks also provide a protective barrier between the service medium and the local environment. This would include pipes, electric cables, junctions, penetrations.

D. SPECIAL SAFETY SYSTEMS

The special safety systems comprise the following group of systems:

a) Shutdown System #1
b) Shutdown System #2
c) Emergency Core Cooling System
d) Containment

While the first three systems are single, self-contained systems, the Containment system includes several sub-systems which combine to secure the containment envelope and suppress any post-accident pressure rise in the reactor building. The following containment subsystems have been included in this study:

i) Containment Isolation System
ii) Dousing System
iii) Reactor Building Cooling System
iv) Reactor Building Ventilation System

The equipment list referred to in this report identifies the equipment in each of these seven systems that must be qualified - i.e. only that equipment that must be shown to be capable of performing under abnormal operational and environmental loads that would arise at any time in its lifetime due to the occurrence of any postulated design basis events. The list was assembled by applying the qualification selection criteria explained below to the whole of each of the aforementioned systems, and only that equipment that fulfilled any of these criteria was included. This equipment list does not include an inventory of the components for each item of identified equipment, but in many cases a note has been added to the effect that some important components that have been implicitly included under the equipment heading should not be overlooked in the EQ program.

To assure execution of the required safety function(s) of qualified equipment in the special safety systems, the supply of necessary support services to those items need also be qualified. Components in the distribution network of support services that need to be qualified are included in the list.

E. FORMAT OF EQUIPMENT LIST AND CONTENT OF DATA SHEETS

The equipment list is contained in Appendix A to this report. It has been divided into seven separate sections, corresponding to the seven systems considered. The qualified equipment items are identified by the item's system identification number (e.g. 31743-VFD2-RE5A,B) together with a brief description (e.g. Vertical Flux Detectors). The equipment list for each system is grouped into three categories: :"mechanical", "control and instrumentation" and "electrical".

A data sheet has been compiled for each entry appearing on the equipment list, containing some basic data relevant to the qualification of that equipment item, but as these are intended for use by AECB staff, they do not form part of the published report. The data contained inthe data sheet includes:

- Component Identification number and description

- Location in the plant
- Environment
- Special Location Features
- Support Services
- Seismic Classification
- Safety Function
- Consequence of failure
- Reference Flow Sheets

- Manufacturer *
- Model number *
- Mission time *
- Stock Code Number (SCN) *
- Piping/Cable Identification numbers *

The purpose of these data sheets is to provide some information that will be useful in reviewing the qualification status of equipment identified in the equipment list. The information in the first nine categories above was thought to be the minimum required for this purpose. Data in the categories marked with an asterisk was considered less important and was included wherever it was readily retrievable from the documents accessed during the identification process. The above data has been compiled in a standard format on individual data sheets arranged in the same order as the equipment listed in Appendix A.

Most of the above categories of auxiliary data are self-explanatory, however they do contain some implicit assumptions. The following brief explanations have been included where clarification is indicated.

1. Component ID

The identification number of the equipment that is recorded in the data sheets comprises a combination of the system USI number, the equipment code and number appearing on the flow sheets, and uniquely identifies the equipment item. For example, one of the quick-opening valves in Shutdown System number 2 is listed as 34700-PV1G. In many cases an identical equipment item has been used in the same location in each of the three channels and has the same identification number except for the channel label - "G" in this case. In these situations, and the other similar cases where a spare (and identical) item is located in essentially the same place, the identification number is expanded by commas to indicate that these identical items are included - for example "34700-PV1G, H, K".

There are a several cases where a group of identical equipment items are included under a single entry in the equipment list, and thus only one data sheet has been included, but these items are not necessarily in the same location. An example of this is the six poison tank transmitters in SDS2, which have been

identified as "63470-LT1 thru 6".

Electrical power and instrumentation cables that must be qualified are listed indirectly via references to the electrical block diagrams on the data sheets corresponding to the identified junction boxes and electrical panels.

2. Location

The location of the equipment has been identified by room number and elevation. As the reactor building reference elevation for Pt Lepreau is not the same as Gentilly-2, two figures have been included for elevation. The figure in brackets corresponds to Gentilly 2. Where the location has not been determined with certainty, this is noted on the data sheets.

3. Support Services

Support services may be instrument air, electrical power or cooling water required by the identified equipment item to perform an operation essential in that system's execution of a safety function. For example, a supply of instrument air is needed by the quick-acting pneumatic actuator to open the globe valves of SDS2. The electrical power needed to actuate the solenoid valves to open the air supply to each globe valve actuator is included on the solenoid valve's data sheet. Similarly the qualified path of that electrical power inside the reactor building is identified by the junction boxes listed under that system. In this way, the support services required by each equipment item have been listed.

There are numerous cases of equipment items that must be qualified but are fail safe items. They need some support service(s) in order to perform their normal operation, but during the execution of their system's safety function, the equipment items do not perform an <u>active</u> role. A typical example would be an isolation valve that is normally closed, and fails closed on loss of services, and is opened only during testing or maintenance procedures. The safety-related role of such a valve is simply to maintain pressure boundary integrity. As it does not require qualified support services, support services would be identified as 'N/A' on the data sheet.

4. Environment

The environmental conditions for EQ purposes have been categorized as either "Harsh" or "Mild".

A "Mild" environment is one in which the ambient temperature, pressure, humidity and radiation levels would not exceed those expected during normal or upset service conditions, and do not give rise to significant aging mechanisms. Equipment located in mild environments has been excluded from the equipment list. Generally this applies to all equipment outside of containment, away from piping systems transporting high energy or radioactive fluids.

The "Harsh" category indicates that the equipment could be required to operate under extreme service conditions of elevated temperature, pressure and humidity that would result from a design basis accident such as a steam main failure or high pressure feedwater line failure, and also a loss of coolant accident (LOCA), which may also have associated high radiation fields. For simplicity in this study, the qualification environment for all equipment located within the containment boundary has been classed as "Harsh".

None of the 600 MW special safety systems outside containment is near to steam mains or feedwater lines.

5. Location Features

Under this heading, the intention was to record local service conditions that could have a bearing on the equipment's performance, mainly during design basis accidents, and that should therefore be taken into consideration in the EQ program. For example, effects such as local flooding, steam impingement, mechanical damage (pipewhip, vibration) might be identified.

During this study, it was found that in practice, identifying potential local service conditions is difficult to achieve and to perform a thorough investigation would require considerably more time and effort than was available within the scope of this study. In performing our on-site investigations some time was spent searching for such location features, but all that was identified was the potential exposure of a few local air cooler motors to water from the dousing sprays.

6. Seismic Classification

Seismic qualification forms an important part of the EQ progamme, and therefore the seismic classification of equipment has been included in the data sheets.

In the 600 MW CANDU design, there are two categories: Category A in which the equipment must retain its pressure boundary integrity during a design basis earthquake, and Category B in which the equipment must also retain its mechanical/electrical function to maintain the safety-related system operation.

All equipment items in the special safety systems that have been assigned a seismic classification have been included in the equipment list.

7. Mission Time

Mission time is an important consideration in establishing EQ test requirements. It is the time during which the equipment must retain its functional ability, and this may vary for the different postulated accident scenarios considered. For simplicity in this study, three time ranges bracketing the expected mission time were defined for the purposes of completing the equipment data sheets. Selection of particular mission time periods in the data sheets has been based upon an general understanding of the operation of the special safety systems concerned, but no attempt has been made to verify these mission times against the safety analyses of the various design basis accidents for the plant. The mission time periods were defined as follows:

Short - less than 3 minutes
Medium - more than 3 minutes, but less than 30 minutes
Long - more than 30 minutes

For some equipment items two categories have been specified, one for the equipment to perform its initial safety function (E.G. reactor shutdown), and the other for a long-term monitoring role.

F. IDENTIFICATION CRITERIA

The fundamental qualification requirement of equipment in the special safety systems is to demonstrate that the equipment can perform its particular required function in that special safety system's operation when operational and environmental loads are imposed on it by the occurrence of any postulated service condition arising from an assumed design basis event. As many equipment items in the special safety systems at no time experience an environment that is more than the environment that occurs during normal plant operation (including anticipated transients), there is no need to include it in the qualification equipment list. Furthermore, some of the special safety system equipment does not perform a role in the system's performance of its safety function - e.g. test equipment - and cannot influence the system's safety function by its failure. This equipment also need not be included in the qualification list.

These criteria formed the basis of the identification process that determined which equipment should be included in the qualification equipment list. The sequence in which the selection criteria were applied during the process is

illustrated in the simple flow chart in Figure 1 and summarized below:

1) All equipment that can experience a "Harsh" environment are potential candidates for the qualification list? For the specific case of the special safety systems, this can be restated as:

   - Is the equipment inside or outside the reactor building?

2) If the equipment will experience only a "Mild" environment, then it is excluded from the qualification list unless it must be seismically qualified. The main selection criterion for equipment that is only ever exposed to a "Mild" environment is:

   - Is the equipment seismically qualified?

3a) "Harsh" environment equipment items that play a role in executing the safety functions need to be included in the qualification list. To eliminate equipment included for other purposes, the second selection criterion is:

   - Does the equipment play a role in the execution of the safety function?

3b) Any equipment item that does not play an active role but can bring about an operational impairment or execution failure of the system's safety function as a result of its own failure or maloperation, should be included and the supply of its required services assured by qualification.

   - Can its failure by common cause mechanisms affect the safety system operation?

4) An equipment item that has been selected for the qualification list often comprise several components, but if it is required to perform only a passive role - e.g. an isolating valve that forms part of the pressure boundary but is operated only during testing routines - then not all of its components need be qualified. Only the mechanical part need be listed and no reference need be made to other parts of the item like a valve operator, limit switches etc. Restated, this last criterion is:

   - Does the identified equipment item perform only a passive role?

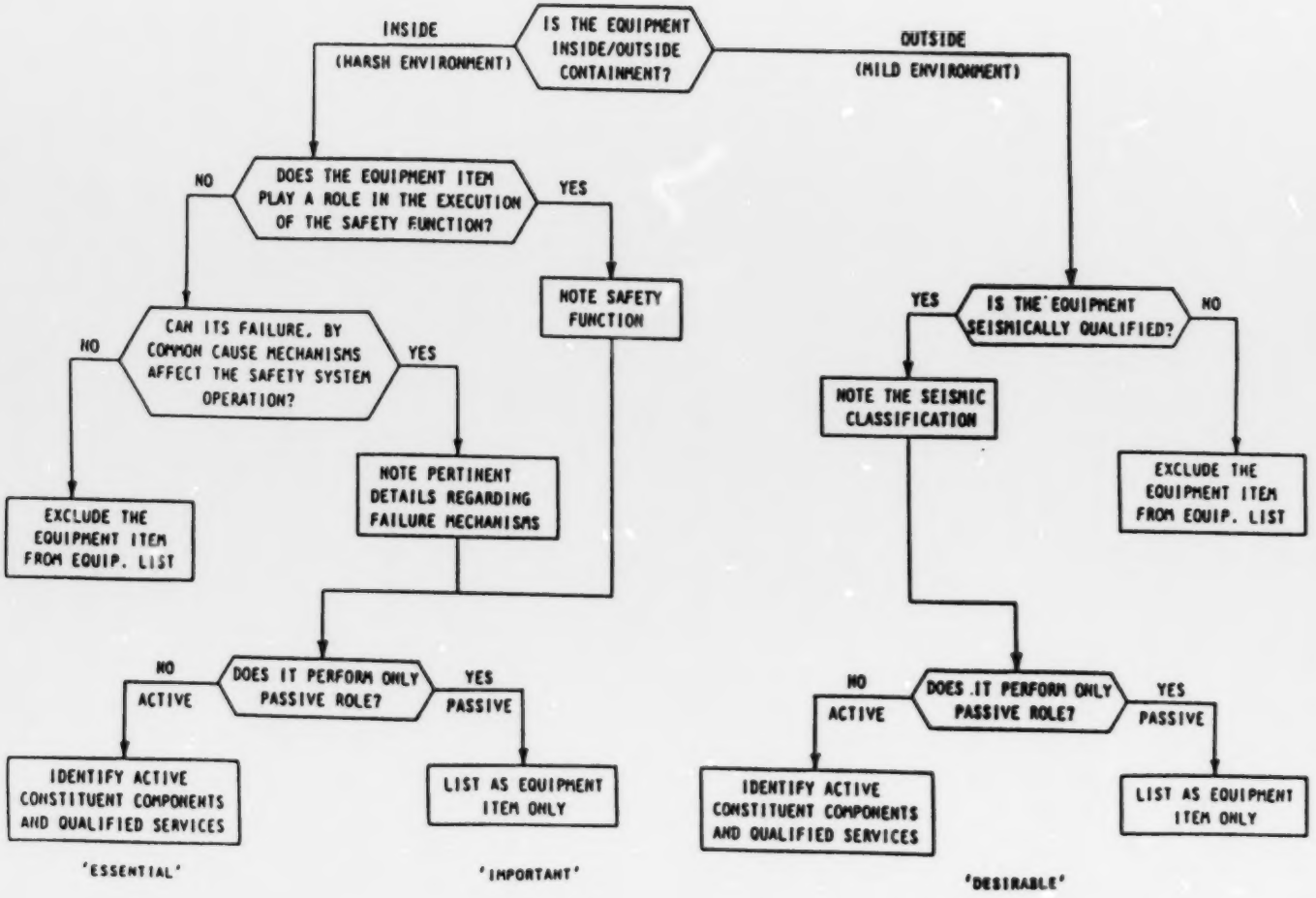

FIGURE 1 APPLICATION OF SELECTION CRITERIA

Having briefly explained the identification process, the reasoning adopted in applying the criteria is discussed in the sections below.

1. Is the Equipment Inside/Outside Containment?

It was assumed that all equipment located inside the reactor building would be exposed to the "Harsh" environment conditions that arise following the occurrence of a LOCA, and other major in-containment design basis accidents. Therefore all equipment items inside containment were considered to be candidates for inclusion in the list.

The environment outside containment can be regarded as "Mild", except in the areas that would be affected by heat and moisture (due to condensation or flooding) from a steam main or feedwater line rupture in the service building or turbine building. None of the special safety systems are located near such areas, so it is necessary to consider qualifying only those systems that supply support services needed for the execution of the basic safety functions following either of these two design basis events. Obvious contenders for qualification are those electrical and control equipment located in these areas that can impair the reactor cooldown safety function. However, as the combination of the Emergency Power Supply (EPS) and Emergency Water Supply (EWS) systems, which are not located in these affected areas, can fulfill this function, there is no need to qualify the abovementioned sections of the service support systems outside containment.

2. If Outside, is it Seismically Qualified?

The potential for an earthquake precipitating common cause failures throughout the plant is accounted for in the design by seismic qualification of certain safety-related equipment and structures. Seismically qualified equipment must therefore be included in the EQ master list.

The seismic classification of an equipment item was used as a selection criterion mainly for equipment located in a "Mild" environment. Thus most of the containment isolation valves, which are outside of the containment building, are in the list, as are most of the high pressure emergency core cooling equipment items outside the containment. Monitoring equipment considered to be associated with seismically qualified equipment (e.g. the radiation detectors for containment isolation) was also included in the equipment list.

It should be made clear that in applying seismic qualification as a selection criterion in this study, no attempt was made to assess the validity or the rigour of the seismic design

philosophy applied to the CANDU 600 MW plants.

3. Does it play a role in executing a Safety Function?

There are many equipment items built into each special safety system that are inside containment that serve a function, but they do not perform a necessary role, either active or passive, in the execution of the safety system's functions. This criterion was intended to eliminate all such equipment.

A typical example of where this criterion was effective was in the assessment of control and instrumentation circuitry built into the design for the sole purpose of permitting regular testing of the various safety systems. Except during testing procedures, these equipment items remain isolated from the operational side of the system and cannot contribute to the execution of the safety function during or following a postulated accident. Such items were excluded from the equipment list. Only those control and instrumentation circuit items - typically the normally-closed, fail-closed test circuit isolation valves - that serve some other necessary function (e.g. maintenance of the pressure boundary, in this case) were included in the list.

3.1 Can its failure affect the Safety System Operation?

Equipment eliminated by the above criterion should not be included on the list, provided the maloperation of such items through possible common cause failure mechanisms are of no consequence to the execution of the system's function. In this category, what was being sought out was failure modes that lead to 'unsafe' conditions, or the potential for fail-safe states being overridden by associated logic circuits.

4. Does it play only a Passive Role?

Qualified equipment that is identified by a single number often comprises several individual active constituent components, e.g. electrically operated valves fitted with Limitorque actuators and position indicating limit switches. This poses a question as to whether to include some reference to all, or some, or none of these components in the list. In an attempt to keep the equipment list complete, but free of unnecessary items, the following approach was adopted:

- Constituent items would not be identified uniquely in the equipment list.

- If a particular equipment item, comprising two or more components, performs only a passive duty in the system's safety function, then no reference is made to the components in the data sheet. This would be the case, for example, with an electrically operated isolation valve whose safety role during "Harsh" conditions is only to remain closed and preserve the pressure boundary.

- Components whose operation in "Harsh" conditions is necessary to the performance of the equipment's safety role, are identified on the data sheets. So if the actuation of a qualified valve is required, a note indicating that the valve operator and limit and/or torque switches, if applicable, must be included in the qualification program has been added.

- The approach to position indicating limit switches has been as follows: These are excluded from the data sheets except where the remote indication of an equipment item's operational position is a necessary requirement for plant safety (as implied by the plant safety analysis) or if the switch plays an active role in a required valve operation (as noted in the preceeding paragraph).

G. IDENTIFICATION PROCEDURE

A routine procedure was carefully followed for each system, with only one system being reviewed at a time. The operational flow sheets of the systems were used as a check list by marking off the individual mechanical, electrical and instrumentation equipment as the evaluation proceeded.

For all equipment inside containment, the first step was to determine the required role of each equipment item during the execution of that system's safety function, by referring to information contained in system design manuals, reliability studies, safety design matrix studies, safety reports and equipment data sheets. If the equipment item under examination satisfied the criteria described above, it was added to the equipment list and the pertinent qualification data, described above, assembled from the documentation was entered on the item's data sheet.

Electrical equipment items identified individually include motors, junction boxes, electrical panels and cables. While junction boxes and panels have been identified as individual items that must be qualified, they also indicate the qualified route of electrical support services coming in from the service building.

When all of the mechanical and electrical items had been accounted for, the roles performed by associated instrumentation and control loops in executing the safety functions, including monitoring, were then addressed. The operational flowsheets

showing the control and testing loops - for example the dousing system control loops - were used to check that all items were considered in the identification process.

Once the equipment list was completed, the contents was checked for omissions against the items identified in the basic events of fault trees generated for determining the major contributors to system unavailability. These fault trees form part of the reliability reports on assessing equipment testing frequencies in the various safety systems.

The equipment list was also checked for omissions against the equipment lists compiled by AECL.

Towards the end of the identification process, when the qualified equipment list was almost complete, an opportunity arose to perform a close-up, first-hand inspection of the accessible equipment on the list during a scheduled plant outage at Gentilly-2. This made it possible to check the content and completeness of the list compiled to date, to identify possible errors and/or omissions resulting from differences between the design documentation and actual plant installation, to inspect the interfaces between identified equipment items and their service supplies, and to make a brief assessment of potential variations in local service conditions (as discussed in Section B.5). This site visit proved worthwhile, inasmuch as it at least confirmed the accuracy of the list, and provided a useful opportunity to engage in consultations with AECB site officers familiar with the technical details of all of the systems.

H. CATEGORIZATION OF IDENTIFIED EQUIPMENT

The above-mentioned selection process has identified approximately 1000 items of equipment in the CANDU 600MW special safety systems that should be included in the EQ program. In rigorous implementation of an EQ program, all equipment items included in the list should be qualified for their designated service conditions at the start of the plant lifetime, and should continue to be scrutinized during operation and maintenace schedules until the plant is decommissioned.

To assist AECB staff in the task of reviewing the qualification status of this long list of equipment, a scheme for priorizing their efforts was devised. Equipment items have been sorted into three categories of descending priority for reviewing, the top category having been categorized as "Essential", followed by "Important" and "Desirable". These terms have been incorporated in the equipment list included in Appendix A. It should be understood that these terms do not reflect the relative need for qualifying the equipment, for all equipment on the list must be qualified.

Equipment qualification requirements range from assuring active operation in a harsh environment, to assuring only seismic qualification to an otherwise mild environment. Top priority in reviewing qualification status should be assigned to equipment located in harsh environments whose failure or maloperation due to common cause mechanisms would inhibit the safety system's function. Such equipment has been labled "Essential" in Appendix A. The next in priority should be all other equipment in the list that is also located in a harsh environment, which does not perform an active function but whose failure could prevent the proper execution of the system's safety function. All this equipment has been labeled "Important". The remaining equipment which is located in a mild environment, and requiring seismic qualification only, has been assigned the lowest priority for review. This has been labeled "Desirable".

At the start of the study, it was proposed that the basis for establishing the priority for review the effect that the equipment items' "failure" had on the operation of their associated system. While this appeared reasonable, its actual implementation was not straightforward. Considering the criteria in the context of the underlying EQ objective - viz. the prevention of common cause failures of redundant equipment - postulating the failure of even redundant qualified items, implies system failure. Applying this logic, in effect divided the equipment into only two groups, with most of the items falling into the top priority "Essential" category. Only for the few cases where there is redundancy and diversification within a system (e.g. the solenoid and pneumatic valves in the dousing system logic) would there be items in the "Important" category, and none in the "Desirable" category. This scheme was, therefore, not very effective in establishing an order for review, so instead of grouping the equipment by applying criteria based upon its failure effect, priority was established by adopting the criteria described above.

I. CONCLUSIONS

A list of equipment in the special safety systems that must be qualified, has been assembled in Appendix A. This represents the minimum list of equipment to be included in the plant EQ program for these special safety systems.

Each item on the equipment list has been assigned one of the categories entitled "Essential", "Important" or "Desirable", as an aid to priorizing a review of the equipment qualification status.

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APPENDIX A

LIST OF QUALIFIED EQUIPMENT

68200 SHUTDOWN SYSTEM # 1

1) MECHANICAL COMPONENTS

Component ID	Description	Priority	Data Sheet
31370-SA1 thru 26	Shut Off Rod Mechanism (clutch, sheave)	Essential	1 006

2) INSTRUMENT & CONTROL COMPONENTS

Component ID	Description	Priority	Data Sheet
31743-VFD2-RE5A, B thru 31743-VFD25-RE5A, B	Vertical Flux Detectors	Essential	1 008
31790-IC-1, 2, 3	Ion Chambers	Essential	1 009
68233-PV1D#1, E#1, F#1	Isolating Valve	Important	1 010
68233-PV1D#2, E#2, F#2	Isolating Valve	Important	1 011
68233-PT1D, E, F	Pressure Transmitter	Essential	1 012
68233-V1D#1, E#1, F#1	Manual Isolating Valve	Important	1 013
68233-PV2D#1, E#1, F#1	Isolating Valve	Important	1 014
68233-PV2D#2, E#2, F#2	Isolating Valve	Important	1 015
68233-PT2D, E, F	Pressure Transmitter	Essential	1 016
68233-V2D#1, E#1, F#1	Manual Isolating Valve	Important	1 017
68233-PV3D#1, E#1, F#1	Isolating Valve	Important	1 018
68233-PV3D#2, E#2, F#2	Isolating Valve	Important	1 019
68233-PT3D, E, F	Pressure Transmitter	Essential	1 020
68233-V3D#1, E#1, F#1	Manual Isolating Valve	Important	1 021
68233-PV4D#1, E#1, F#1	Isolating Valve	Important	1 022
68233-PV4D#2, E#2, F#2	Isolating Valve	Important	1 023

2) INSTRUMENT & CONTROL COMPONENTS (Continued)

Component ID	Description	Priority	Data Sheet
68233-PT4D, E, F	Pressure Transmitter	Essential	1 024
68233-V4D#1, E#1, F#1	Manual Isolating Valve	Important	1 025
68234-PV1D#1, E#1, F#1	Isolating Valve	Important	1 026
68234-PV1D#2, E#2, F#2	Isolating Valve	Important	1 027
68234-FT1D, E, F	Flow Transmitter	Essential	1 028
68234-V1D, E, F	Valve Manifold	Important	1 029
68234-PV2D#1, E#1, F#1	Isolating Valve	Important	1 030
68234-PV2D#2, E#2, F#2	Isolating Valve	Important	1 031
68234-FT2D, E, F	Flow Transmitter	Essential	1 032
68234-V2D, E, F	Valve Manifold	Important	1 033
68234-PV3D#1, E#1, F#1	Isolating Valve	Important	1 034
68234-PV3D#2, E#2, F#2	Isolating Valve	Important	1 035
68234-FT3D, E, F	Flow Transmitter	Essential	1 036
68234-V3D, E, F	Valve Manifold	Important	1 037
68234-PV4D#1, E#1, F#1	Isolating Valve	Important	1 038
68234-PV4D#2, E#2, F#2	Isolating Valve	Important	1 039
68234-FT4D, E, F	Flow Transmitter	Essential	1 040
68234-V4D, E, F	Valve Manifold	Important	1 041
68236-SV1D, E, F	Isolating Valve	Important	1 042
68236-PT1D, E, F	Pressure Transmitter	Essential	1 043
68237-PV1D#1, E#1, F#1	Isolating Valve	Important	1 044
68237-PV1D#2, E#2, F#2	Isolating Valve	Important	1 045
68237-LT1D, E, F	Level Transmitter	Essential	1 046
68237-V1D#1, E#1, F#1	Manual Isolating Valve	Important	1 047
68237-V1D#3, E#3, F#3	Manual Isolating Valve	Important	1 048
68238-PV1D#1, E#1, F#1	Isolating Valve	Important	1 049
68238-V1D#1, E#1, F#1	Manual Isolating Valve	Important	1 050
68238-V1D#2, E#2, F#2	Manual Isolating Valve	Important	1 051
68238-PV1D#3, E#3, F#3	Isolating Valve	Important	1 052
68238-LT1D, E, F	Level Transmitter	Essential	1 053
68238-PV1D2	Isolating (drain) Valve	Important	1 054
68238-V1D1, E1, F1	Manual Isolating Valve	Important	1 055
68238-PV2D#1, E#1, F#1	Isolating Valve	Important	1 056
68238-V2D#1, E#1, F#1	Manual Isolating Valve	Important	1 057

2) INSTRUMENT & CONTROL COMPONENTS (Continued)

Component ID	Description	Priority	Data Sheet
68238-V2D#2, E#2, F#2	Manual Isolating Valve	Important	1 058
68238-PV2D#3, E#3, F#3	Isolating Valve	Important	1 059
68238-LT2D, E, F	Level Transmitter	Essential	1 060
68238-PV2D2	Isolating (drain) Valve	Important	1 061
68238-V2D1, E1, F1	Manual Isolating Valve	Important	1 062
68241-V1D, E, F	Manual Isolating Valve	Important	1 063
68241-V2D, E, F	Manual Isolating Valve	Important	1 063
68241-V3D, E, F	Manual Isolating Valve	Important	1 063
68241-V4D, E, F	Manual Isolating Valve	Important	1 063
68241-PV1D, E, F	Pneumatic Valve	Important	1 064
68241-PV2D, E, F	Pneumatic Valve	Important	1 064
68241-PV3D, E, F	Pneumatic Valve	Important	1 064
68241-PV4D, E, F	Pneumatic Valve	Important	1 064
68241-PT1D, E, F	Pressure Transmitter	Essential	1 065
68241-PT2D, E, F	Pressure Transmitter	Essential	1 065
68241-PT3D, E, F	Pressure Transmitter	Essential	1 065
68241-PT4D, E, F	Pressure Transmitter	Essential	1 065

3) ELECTRICAL COMPONENTS

Component ID	Description	Priority	Data Sheet
68220-JB 1649	Junction Box	Important	1 067
68220-JB 1657	Junction Box	Important	1 068
68220-JB 3650	Junction Box	Important	1 069
68220-JB 3655	Junction Box	Important	1 070
60720-PL 1002	Electrical Panel	Important	1 071
60720-PL 1004	Electrical Panel	Important	1 071
60720-PL 1006	Electrical Panel	Important	1 072
60720-PL 1008	Electrical Panel	Important	1 072
68236-PL 1203	Electrical Panel	Important	1 073

3) ELECTRICAL COMPONENTS (Continued)

Component ID	Description	Priority	Data Sheet
60720-PL 1031	Electrical Panel	Important	1 074
60720-PL 1033	Electrical Panel	Important	1 074
60720-PL 1035	Electrical Panel	Important	1 075
60720-PL 1037	Electrical Panel	Important	1 075
68236-PL 1332	Electrical Panel	Important	1 076
60720-PL 1062	Electrical Panel	Important	1 077
60720-PL 1063	Electrical Panel	Important	1 077
60720-PL 1066	Electrical Panel	Important	1 078
60720-PL 1067	Electrical Panel	Important	1 078
68236-PL 1366	Electrical Panel	Important	1 079

68300 SHUTDOWN SYSTEM # 2

1) MECHANICAL COMPONENTS

Component ID	Description	Priority	Data Sheet
34700-PV1Q, H, J	Quick opening valve	Essential	2 005
34700-PV2Q, H, J	Quick opening valve	Essential	2 006
34700-PV3Q, H, J	Pneumatic Globe valve	Essential	2 007
34700-PV55	Pneumatic Globe Valve	Essential	2 008
34700-V101 thru V106	Manual Globe Valve	Important	2 009
34700-V111 thru V116	Manual Globe Valve	Important	2 010
34700-V131 thru V136	Manual Globe Valve	Important	2 011
34700-V20 thru V26	Manual Globe Valve	Important	2 012
34700-V8	Manual Globe Valve	Important	2 013
34700-V11	Manual Globe Valve	Important	2 014
34710-TK1 thru 6	Poison Tank	Important	2 014 1
34710-TK10	Helium Supply Tank	Important	2 010 2

2) INSTRUMENT & CONTROL COMPONENTS

Component ID	Description	Priority	Data Sheet
63470-SV1Q, H, J	Solenoid valve	Essential	2 016
63470-SV2Q, H, J	Solenoid valve	Essential	2 017
63470-SV3Q, H, J	Solenoid valve	Essential	2 018
63470-SV55	Solenoid valve	Essential	2 019
63470-PS50	Pressure Switch	Essential	2 020
63470-LT1 thru 6	Level Transmitter	Important	2 021
68331-HFD-1Q1,2 thru 68331-HFD-9J1,2	Flux Detectors	Essential	2 022

2) INSTRUMENT & CONTROL COMPONENTS (Continued)

Component ID	Description	Priority	Data Sheet
63179-IC-4, 5, 6	Ion Chambers	Essential	2 023
68333-PV1G#1, H#1, J#1	Isolating Valve	Important	2 024
68333-PV2G#1, H#1, J#1	Isolating Valve	Important	2 024
68333-PV1G#2, H#2, J#2	Isolating Valve	Important	2 025
68333-PV2G#2, H#2, J#2	Isolating Valve	Important	2 025
68333-PT1G, H, J	Pressure Transmitter	Essential	2 026
68333-PT2G, H, J	Pressure Transmitter	Essential	2 026
68333-V1G, H, J	Manual Globe Valve	Important	2 027
68333-V2G, H, J	Manual Globe Valve	Important	2 027
68334-PV1G#1, H#1, J#1	Isolating Valve	Important	2 028
68334-PV1G#2, H#2, J#2	Isolating Valve	Important	2 029
68334-PT1G, H, J	Pressure Transmitter	Essential	2 030
68334-V1G, H, J	Manual Valve	Important	2 031
68334-V1G#4, H#4, J#4	Manual Valve	Important	2 032
68334-PV2G#1, H#1, J#1	Isolating Valve	Important	2 033
68334-PV2G#2, H#2, J#2	Isolating Valve	Important	2 034
68334-PT2G, H, J	Pressure Transmitter	Essential	2 035
68334-V2G, H, J	Manual Valve	Important	2 036
68334-V2G#4, H#4, J#4	Manual Valve	Important	2 037
68334-PV3G#1, H#1, J#1	Isolating Valve	Important	2 038
68334-PV3G#2, H#2, J#2	Isolating Valve	Important	2 039
68334-PT3G, H, J	Pressure Transmitter	Essential	2 040
68334-V3G, H, J	Manual Valve	Important	2 041
68334-V3G#4, H#4, J#4	Manual Valve	Important	2 042
68334-PV4G#1, H#1, J#1	Isolating Valve	Important	2 043
68334-PV4G#2, H#2, J#2	Isolating Valve	Important	2 044
68334-PT4G, H, J	Pressure Transmitter	Essential	2 045
68334-V4G, H, J	Manual Valve	Important	2 046
68334-V4G#4, H#4, J#4	Manual Valve	Important	2 047
68336-SV1G#1, H#1, J#1	Solenoid Valve	Desirable	2 048
68336-SV2G#1, H#1, J#1	Solenoid Valve	Desirable	2 049
68337-PT1G, H, J	Pressure Transmitter	Important	2 050
68337-PV1G#1, H#1, J#1	Isolating Valve	Important	2 051

2) INSTRUMENT & CONTROL COMPONENTS (Continued)

Component ID	Description	Priority	Data Sheet
68337-PV1G#2, H#2, J#2	Isolating Valve	Important	2 052
68337-LT1G, H, J	Level Transmitter	Essential	2 053
68337-V1G#1, H#1, J#1	Manual Valve	Important	2 054
68337-V1G#2, H#2, J#2	Manual Valve	Important	2 055
68338-LT1G, H, J	Level Transmitter	Essential	2 056
68338-LT2G, H, J	Level Transmitter	Essential	2 056
68338-PV1G#1, H#1, J#1	Isolating Valve	Important	2 057
68338-PV2G#1, H#1, J#1	Isolating Valve	Important	2 057
68338-PV1G#2, H#2, J#2	Isolating Valve	Important	2 058
68338-PV2G#2, H#2, J#2	Isolating Valve	Important	2 058
68338-PV1G#3, H#3, J#3	Isolating Valve	Important	2 059
68338-PV2G#3, H#3, J#3	Isolating Valve	Important	2 059
68338-V44 thru V49	Manual Valve	Important	2 060
68341-PV1G#1, H#1, J#1	Isolating Valve	Important	2 061
68341-PV2G#1, H#1, J#1	Isolating Valve	Important	2 061
68341-PV3G#1, H#1, J#1	Isolating Valve	Important	2 061
68341-PV4G#1, H#1, J#1	Isolating Valve	Important	2 062
68341-PV1G#2, H#2, J#2	Isolating Valve	Important	2 062
68341-PV2G#2, H#2, J#2	Isolating Valve	Important	2 062
68341-PV3G#2, H#2, J#2	Isolating Valve	Important	2 062
68341-PV4G#2, H#2, J#2	Isolating Valve	Important	2 063
68341-PT1G, H, J	Pressure Transmitter	Essential	2 063
68341-PT2G, H, J	Pressure Transmitter	Essential	2 063
68341-PT3G, H, J	Pressure Transmitter	Essential	2 063
68341-PT4G, H, J	Pressure Transmitter	Essential	2 064
68341-V1G#1, H#1, J#1	Manual Valve	Important	2 064
68341-V2G#1, H#1, J#1	Manual Valve	Important	2 064
68341-V3G#1, H#1, J#1	Manual Valve	Important	2 064
68341-V4G#1, H#1, J#1	Manual Valve	Important	2 064

3) ELECTRICAL COMPONENTS

Component ID	Description	Priority	Data Sheet
63470 JB-1921	Junction Box	Important	2 066
63470 JB-2921	Junction Box	Important	2 067
63470 JB-3921	Junction Box	Important	2 068
63470 JB-1843	Junction Box	Important	2 069
63470 JB-1883 thru -1886	Junction Box	Important	2 070
63470 JB-2842 thru -2847	Junction Box	Important	2 071
63470 JB-2881	Junction Box	Important	2 072
63470 JB-1800	Junction Box	Important	2 073
63470 JB-1803	Junction Box	Important	2 074
63470 JB-2800	Junction Box	Important	2 075
63470 JB-2802	Junction Box	Important	2 076
63470 JB-2803	Junction Box	Important	2 077
63470 JB-3800	Junction Box	Important	2 078
63470 JB-3803	Junction Box	Important	2 079
63470-PL-1321	Electrical Panel	Important	2 080
63471-PL-1322	Electrical Panel	Important	2 081
63471-PL-1323	Electrical Panel	Important	2 081
63471-PL-2059	Electrical Panel	Important	2 082
63470-PL-1351	Electrical Panel	Important	2 083
63470-PL-1352	Electrical Panel	Important	2 084
63470-PL-1353	Electrical Panel	Important	2 084
63470-PL-2060	Electrical Panel	Important	2 085
63471-PL-1382	Electrical Panel	Important	2 086
63471-PL-1383	Electrical Panel	Important	2 086
63471-PL-2061	Electrical Panel	Important	2 087
63470-PL-1154 thru -1159	Electrical Panel	Important	2 088
68320-PL-1121	Transmitter Rack	Important	2 089
68320-PL-1122	Transmitter Rack	Important	2 090
68320-PL-1151	Transmitter Rack	Important	2 091
68320-PL-1181	Transmitter Rack	Important	2 092
68320-PL-1182	Transmitter Rack	Important	2 093
63470-PL-1052	Electrical Panel	Important	2 094
63470-PL-1085	Electrical Panel	Important	2 095

3432 EMERGENCY CORE COOLING SYSTEM

1) MECHANICAL COMPONENTS

Component ID	Description	Priority	Data Sheet
3432 MV-31	12" Elect Operated, Gate Valve	Essential	3 006
3432 MV-39	10" Elect Operated, Gate Valve	Essential	3 007
3432 MV-40	10" Elect Operated, Gate Valve	Essential	3 008
3432 MV-41	10" Elect Operated, Gate Valve	Essential	3 009
3432 MV-42	10" Elect Operated, Gate Valve	Essential	3 010
3432 MV-43	10" Elect Operated, Gate Valve	Essential	3 011
3432 MV-44	10" Elect Operated, Gate Valve	Essential	3 012
3432 MV-45	10" Elect Operated, Gate Valve	Essential	3 013
3432 MV-46	10" Elect Operated, Gate Valve	Essential	3 014
3432 MV-50	12" Elect Operated, Gate Valve	Essential	3 015
3432 MV-59	10" Elect Operated, Gate Valve	Essential	3 016
3432 MV-60	10" Elect Operated, Gate Valve	Essential	3 017
3432 MV-61	10" Elect Operated, Gate Valve	Essential	3 018
3432 MV-62	10" Elect Operated, Gate Valve	Essential	3 019
3432 MV-63	10" Elect Operated, Gate Valve	Essential	3 020
3432 MV-64	10" Elect Operated, Gate Valve	Essential	3 021
3432 MV-65	10" Elect Operated, Gate Valve	Essential	3 022
3432 MV-66	10" Elect Operated, Gate Valve	Essential	3 023
3432 MV-71	12" Elect Operated, Gate Valve	Important	3 024
3432 MV-72	12" Elect Operated, Gate Valve	Important	3 025
3432 MV-79	12" Elect Operated, Gate Valve	Essential	3 026
3432 MV-80	12" Elect Operated, Gate Valve	Essential	3 027
3432 PV-8	16" Butterfly Valve	Important	3 028
3432 PV-9	16" Butterfly Valve	Important	3 029
3432 PV-33	12" Swing Check Valve	Essential	3 030
3432 PV-34	12" Swing Check Valve	Essential	3 031
3432 PV-47	12" Swing Check Valve	Essential	3 032
3432 PV-48	12" Swing Check Valve	Essential	3 033

1) MECHANICAL COMPONENTS (Continued)

Component ID	Description	Priority	Data Sheet
3432 V-76	12" Swing Check Valve	Essential	3 034
3432 V-77	12" Swing Check Valve	Essential	3 035
3432 V-96	12" Swing Check Valve	Essential	3 036
3432 V-97	12" Swing Check Valve	Essential	3 037
3432 PV-35	3/4" Pneumatic Globe Valve	Important	3 038
3432 PV-36	3/4" Pneumatic Globe Valve	Important	3 039
3432 PV-54	3/4" Pneumatic Globe Valve	Important	3 040
3432 PV-55	3/4" Pneumatic Globe Valve	Important	3 041
3432 PV-49	1/2" Pneumatic Globe Valve	Important	3 042
3432 PV-52	1/2" Pneumatic Globe Valve	Important	3 043
3432 PV-53	1/2" Pneumatic Globe Valve	Important	3 044
3432 PV-56	1/2" Pneumatic Globe Valve	Important	3 045
3432 PV-73	3/4" Pneumatic Globe Valve	Essential	3 046
3432 PV-74	3/4" Pneumatic Globe Valve	Essential	3 047
3432 PV-78	3/4" Pneumatic Globe Valve	Essential	3 048
3432 V-37	3/4" Manual Globe Valve	Important	3 049
3432 V-38	3/4" Manual Globe Valve	Important	3 050
3432 V-57	3/4" Manual Globe Valve	Important	3 051
3432 V-58	3/4" Manual Globe Valve	Important	3 052
3432 V-114	3/4" Manual Globe Valve	Important	3 053
3432 V-115	3/4" Manual Globe Valve	Important	3 054
3432 V-126	3/4" Manual Globe Valve	Important	3 055
3432 V-127	3/4" Manual Globe Valve	Important	3 056
3432 V-152	3/4" Manual Globe Valve	Important	3 057
3432 V-153	3/4" Manual Globe Valve	Important	3 058
3432 V-145	3/4" Manual Valve	Important	3 059
3432 V-146	3/4" Manual Valve	Important	3 060
3432 V-147	3/4" Manual Valve	Important	3 061
3432 V-148	3/4" Manual Valve	Important	3 062
3432-PV 81	16" Pneumatic Ball Valve	Desirable	3 063
3432-PV 82	16" Pneumatic Ball Valve	Desirable	3 064
3432-V 141	16" Manual Globe Valve	Desirable	3 065
3432-V 142	16" Manual Globe Valve	Desirable	3 066

1) MECHANICAL COMPONENTS (Continued)

Component ID	Description	Priority	Data Sheet
3432-V 143	16" Manual Isolation Valve	Desirable	3 067
3432-V 144	16" Manual Isolation Valve	Desirable	3 068
3432-RV 85	1" Pressure Relief Valve	Desirable	3 069
3432-RV 86	1" Pressure Relief Valve	Desirable	3 070
3432-RV 102	1" Pressure Relief Valve	Desirable	3 071
3432-RV 133	1" Pressure Relief Valve	Desirable	3 072
3432-V 105	1" Check Valve	Desirable	3 073
3432-V 110	1" Check Valve	Desirable	3 074
3432-V 103	2" Manual Isolation Valve	Desirable	3 075
3432-V 104	2" Manual Isolation Valve	Desirable	3 076
3432-V 106	2" Manual Isolation Valve	Desirable	3 077
3432-V 107	2" Manual Isolation Valve	Desirable	3 078
3432-V 108	2" Manual Isolation Valve	Desirable	3 079
3432-V 109	2" Manual Isolation Valve	Desirable	3 080
3432-PV 83	3/4" Pneumatic Isolation Valve	Desirable	3 081
3432-PV 84	3/4" Pneumatic Isolation Valve	Desirable	3 082
3432-V 98	3/4" Check Valve	Desirable	3 083
3432-V 113	3/4" Check Valve	Desirable	3 084
3432-V 15	3/4" Manual Isolation Valve	Desirable	3 085
3432-V 22	3/4" Manual Isolation Valve	Desirable	3 086
3432-V 101	3/4" Manual Isolation Valve	Desirable	3 087
3432-V 111	3/4" Manual Isolation Valve	Desirable	3 088
3432-V 123	3/4" Manual Isolation Valve	Desirable	3 089
3432-V 124	3/4" Manual Isolation Valve	Desirable	3 090
3432-V 131	3/4" Manual Isolation Valve	Desirable	3 091
3432-V 132	3/4" Manual Isolation Valve	Desirable	3 092
3432-V 137	3/4" Manual Isolation Valve	Desirable	3 093
3432-V 138	3/4" Manual Isolation Valve	Desirable	3 094
3432-V 140	3/4" Manual Isolation Valve	Desirable	3 095
3432-MV 75	16" Elec. Isolation Valve	Desirable	3 096
3432-V 3	16" Check Valve	Desirable	3 097
3432-V 4	16" Check Valve	Desirable	3 098
3432-V 5	16" Manual Isolation Valve	Desirable	3 099

1) MECHANICAL COMPONENTS (Continued)

Component ID	Description	Priority	Data Sheet
3432-V 6	16" Manual Isolation Valve	Desirable	3 100
3432-PV 1	18" Pneumatic Isolation Valve	Desirable	3 101
3432-PV 2	18" Pneumatic Isolation Valve	Desirable	3 102
3432-PV 10	12" Pneumatic Isolation Valve	Desirable	3 103
3432-PV 11	12" Pneumatic Isolation Valve	Desirable	3 104
3432-V 139	16" Check Valve	Desirable	3 105
3432-V 99	3/4" Manual Bypass Valve	Desirable	3 106
3432-RV 26	1" Pressure Relief Valve	Desirable	3 107
3432-RV 67	1" Pressure Relief Valve	Desirable	3 108
3432-RV 68	1" Pressure Relief Valve	Desirable	3 108
3432-PV 23	12" Pneumatic Isolation Valve	Desirable	3 109
3432-PV 24	12" Pneumatic Isolation Valve	Desirable	3 110
3432-V 134	16" Manual Isolation Valve	Desirable	3 111
3432-V 135	16" Manual Isolation Valve	Desirable	3 111
3432-V 136	16" Manual Isolation Valve	Desirable	3 111
3432-V 118	4" Manual Isolation Valve	Desirable	3 112
3432-V 69	1/2" Manual Isolation Valve	Desirable	3 113
3432-V 70	1/2" Manual Isolation Valve	Desirable	3 113
3432-V 27	3/4" Manual Isolation Valve	Desirable	3 114
3432-V 30	3/4" Manual Isolation Valve	Desirable	3 114

2) INSTRUMENT & CONTROL COMPONENTS

Component ID	Description	Priority	Data Sheet
63432-PT1K, L, M	Pressure Transmitter	Essential	3 116
63432-PV1K1, L1, M1	Instrument Isolation Valve	Important	3 117
63432-PV1K2, L2, M2	Instrument Isolation Valve	Important	3 118

2) INSTRUMENT & CONTROL COMPONENTS (Continued)

Component ID	Description	Priority	Data Sheet
63432-PT2K, L, M	Pressure Transmitter	Essential	3 119
63432-PV2K1, L1, M1	Instrument Isolation Valve	Important	3 120
63432-PV2K2, L2, M2	Instrument Isolation Valve	Important	3 121
63432-PT201K, L, M	Pressure Transmitter	Essential	3 122
63432-PV201K1, L1, M1	Instrument Isolation Valve	Important	3 123
63432-PV201K2, L2, M2	Instrument Isolation Valve	Important	3 124
63432-PT202K, L, M	Pressure Transmitter	Essential	3 125
63432-PV202K1, L1, M1	Instrument Isolation Valve	Important	3 126
63432-PV202K2, L2, M2	Instrument Isolation Valve	Important	3 127
63432-PT3K, L, M	Diff. Pressure Transmitter	Essential	3 128
63432-SV3K1, L1, M1	Solenoid Isolation Valve	Important	3 129
63432-LT203K, L, M	Level Transmitter	Essentail	3 130
63432-FI203K, L, M	Rotameter	Essential	3 131
63432-TE204K, L, M	RTD Element	Essential	3 132
63432-TE205K, L, M	RTD Element (Spare)	Essential	3 133
63432-TE206K, L, M	RTD Element	Essential	3 134
63432-TE207K, L, M	RTD Element	Essential	3 135
63432-TE208K, L, M	RTD Element	Essential	3 136
63432-TE209K, L, M	RTD Element (Spare)	Essential	3 137
63432-TE213K, L, M	RTD Element	Essential	3 138
63432-TE214K, L, M	RTD Element (Spare)	Essential	3 139
63432-FT6	Diff. Pressure Transmitter	Essential	3 140
63432-FT7	Diff. Pressure Transmitter	Essential	3 141
63432-LT8	Diff. Pressure Transmitter	Essential	3 142
63432-TE9	RTD Element	Essential	3 143
63432-TE10	RTD Element	Essential	3 144
63432-PT16	Pressure Transmitter	Essential	3 145
63432-PT19	Pressure Transmitter	Essential	3 146
63432-PT27	Pressure Transmitter	Essential	3 147
63432-PT28	Pressure Transmitter	Essential	3 148
63432-SV173	Solenoid Valve	Essential	3 149
63432-SV174	Solenoid Valve	Essential	3 150
63432-SV178	Solenoid Valve	Essential	3 151

2) INSTRUMENT & CONTROL COMPONENTS (Continued)

Component ID	Description	Priority	Data Sheet
63432-LT23K, L, M	Level Transmitter	Desirable	3 152
63432-LT215	Level Transmitter	Desirable	3 153
63432-T25K	Temperature Transmitter	Desirable	3 154
63432-PT212K, L, M	Pressure Transmitter	Important	3 155
63432-PV212K1, L1, M1	Isolation Valve	Desirable	3 156
63432-PV212K2, L2, M2	Isolation Valve	Desirable	3 157
63432-PT217K, L, M	Pressure Transmitter	Important	3 158
63432-PV217K1, L1, M1	Isolation Valve	Desirable	3 159
63432-PV217K2, L2, M2	Isolation Valve	Desirable	3 160
63432-PV23K1, L1, M1	Isolation Valve	Desirable	3 161
63432-PV23K2, L2, M2	Isolation Valve	Desirable	3 162
63432-PV23K3, L3, M3	Isolation Valve	Desirable	3 162

3) ELECTRICAL COMPONENTS

Component ID	Description	Priority	Data Sheet
63432-JB-1020	Junction Box	Important	3 164
63432-JB-1488	Junction Box	Important	3 165
63432-JB-1489	Junction Box	Important	3 166
63432-JB-1492	Junction Box	Important	3 167
63432-JB-1659	Junction Box	Important	3 168
63432-JB-2487	Junction Box	Important	3 169
63432-JB-2491	Junction Box	Important	3 170
63432-JB-2492	Junction Box	Important	3 171
63432-JB-2653	Junction Box	Important	3 172
63432-JB-3019	Junction Box	Important	3 173
63432-JB-3488	Junction Box	Important	3 174

3) ELECTRICAL COMPONENTS (continued)

Component ID	Description	Priority	Data Sheet
63432-JB-3489	Junction Box	Important	3 175
63432-JB-3492	Junction Box	Important	3 176
63432-JB-3493	Junction Box	Important	3 177
63432-JB-3494	Junction Box	Important	3 178
63432-JB-3656	Junction Box	Important	3 179
63432-JB-1846	Junction Box	Important	3 180
63432-JB-3845	Junction Box	Important	3 181

CONTAINMENT ISOLATION SYSTEM

1) MECHANICAL COMPONENTS

Component ID	Description	Priority	Data Sheet
7314-PV1	18" Butterfly Damper (D2O Vap Rec)	Desirable	4 004
7314-PV2	18" Butterfly Damper (D2O Vap Rec)	Desirable	4 005
7314-PV3	18" Butterfly Damper (D2O Vap Rec)	Desirable	4 006
7314-PV4	18" Butterfly Damper (D2O Vap Rec)	Desirable	4 007
7314-PV5	30" Butterfly Damper (D2O Vap Rec)	Desirable	4 008
7314-PV6	30" Butterfly Damper (D2O Vap Rec)	Desirable	4 009
7314-PV7	30" Butterfly Damper (D2O Vap Rec)	Desirable	4 010
7314-PV8	30" Butterfly Damper (D2O Vap Rec)	Desirable	4 011
7314-PV9	16" Butterfly Damper (D2O Vap Rec)	Desirable	4 012
7314-PV10	16" Butterfly Damper (D2O Vap Rec)	Desirable	4 013
7314-PV11	16" Butterfly Damper (D2O Vap Rec)	Desirable	4 014
7314-PV12	16" Butterfly Damper (D2O Vap Rec)	Desirable	4 015
7314-PV13	30" Butterfly Damper (R/B Ventil)	Desirable	4 016
7314-PV14	30" Butterfly Damper (R/B Ventil)	Desirable	4 017
7314-PV15	30" Butterfly Damper (R/B Ventil)	Desirable	4 018
7314-PV16	30" Butterfly Damper (R/B Ventil)	Desirable	4 019
7314-PV17	3" Diaphram Valve (R/B Act. Drain)	Important	4 020
7314-PV18	3" Diaphram Valve (R/B Act. Drain)	Desirable	4 021
7314-PV19	6" Diaphram Valve (SFB Purifcn)	Desirable	4 022
7314-PV20	6" Diaphram Valve (SFB Purifcn)	Important	4 023
7314-PV21	2 1/2" Diaphram Valve (D2O Supply)	Desirable	4 024
7314-PV22	2 1/2" Diaphram Valve (D2O Supply)	Important	4 025
7314-PV24	1 1/2" Ball Valve (Resin Transf)	Essential	4 026
7314-PV37	1 1/2" Ball Valve (Resin Transf)	Essential	4 027
7314-PV29	12" Butterfly Damper (SFB Ventil)	Desirable	4 029
7314-PV30	12" Butterfly Damper (SFB Ventil)	Desirable	4 030
7314-PV31	12" Butterfly Damper (SFB Ventil)	Desirable	4 031
7314-PV32	12" Butterfly Damper (SFB Ventil)	Desirable	4 032
7314-SV33N	1" Solenoid Valve (Trit Monitor)	Desirable	4 033
7314-SV34Q	1" Solenoid Valve (Trit Monitor)	Desirable	4 034

2) INSTRUMENT & CONTROL COMPONENTS

Component ID	Description	Priority	Data Sheet
67314-RE-51N1	Radiation Detector	Desirable	4 036
67314-RE-51P1	Radiation Detector	Desirable	4 037
67314-RE-51G1	Radiation Detector	Desirable	4 038
67314-PS-52N	Pressure Switch	Desirable	4 039
67314-PS-52P	Pressure Switch	Desirable	4 040
67314-PS-52G	Pressure Switch	Desirable	4 041
67314-PT-52N	Diff. Pressure Transmitter	Desirable	4 042
67314-PT-52P	Diff. Pressure Transmitter	Desirable	4 043
67314-PT-52G	Diff. Pressure Transmitter	Desirable	4 044

3) ELECTRICAL COMPONENTS

REACTOR BUILDING COOLING SYSTEM

1) MECHANICAL COMPONENTS

Component ID	Description	Priority	Data Sheet
7311-LAC 1	Local Air Cooling Housing	Important	5 005
7311-LAC 2	Local Air Cooling Housing	Important	5 006
7311-LAC 3	Local Air Cooling Housing	Important	5 007
7311-LAC 4	Local Air Cooling Housing	Important	5 008
7311-LAC 5	Local Air Cooling Housing	Important	5 009
7311-LAC 6	Local Air Cooling Housing	Important	5 010
7311-LAC 7	Local Air Cooling Housing	Important	5 011
7311-LAC 8	Local Air Cooling Housing	Important	5 012
7311-LAC 9	Local Air Cooling Housing	Important	5 013
7311-LAC 10	Local Air Cooling Housing	Important	5 014
7311-LAC 11	Local Air Cooling Housing	Important	5 015
7311-LAC 12	Local Air Cooling Housing	Important	5 016
7311-LAC 13	Local Air Cooling Housing	Important	5 017
7311-LAC 14	Local Air Cooling Housing	Important	5 018
7311-LAC 15	Local Air Cooling Housing	Important	5 019
7311-LAC 16	Local Air Cooling Housing	Important	5 020
7311-LAC 17	Local Air Cooling Housing	Important	5 021
7311-LAC 18	Local Air Cooling Housing	Important	5 022
7311-LAC 21	Local Air Cooling Housing	Important	5 023
7311-LAC 22	Local Air Cooling Housing	Important	5 024
7311-LAC 23	Local Air Cooling Housing	Important	5 025
7311-LAC 24	Local Air Cooling Housing	Important	5 026
7311-LAC 25	Local Air Cooling Housing	Important	5 027
7311-LAC 26	Local Air Cooling Housing	Important	5 028
7311-LAC 27	Local Air Cooling Housing	Important	5 029
7311-LAC 28	Local Air Cooling Housing	Important	5 030
7311-LAC 29	Local Air Cooling Housing	Important	5 031
7311-LAC 30	Local Air Cooling Housing	Important	5 032
7311-LAC 31	Local Air Cooling Housing	Important	5 033

1) MECHANICAL COMPONENTS (Components)

Component ID	Description	Priority	Data Sheet
7311-LAC 32	Local Air Cooling Housing	Important	5 034
7311-LAC 33	Local Air Cooling Housing	Important	5 035
7311-LAC 34	Local Air Cooling Housing	Important	5 036
7311-LAC 35	Local Air Cooling Housing	Important	5 037
7311-LAC 36	Local Air Cooling Housing	Important	5 038
7311-LAC 37	Local Air Cooling Housing	Important	5 039

2) INSTRUMENT & CONTROL COMPONENTS

Component ID	Description	Priority	Data Sheet
67311-PV71	LAC Damper Actuator	Essential	5 041
67311-PV72	LAC Damper Actuator	Essential	5 042
67311-PV73	LAC Damper Actuator	Essential	5 043
67311-PV74	LAC Damper Actuator	Essential	5 044
67311-PV75	LAC Damper Actuator	Essential	5 045
67311-PV76	LAC Damper Actuator	Essential	5 046
67311-PV77	LAC Damper Actuator	Essential	5 047
67311-PV78	LAC Damper Actuator	Essential	5 048
67311-SV71	Solenoid Valve	Essential	5 049
67311-SV72	Solenoid Valve	Essential	5 050
67311-SV73	Solenoid Valve	Essential	5 051
67311-SV74	Solenoid Valve	Essential	5 052
67311-SV75	Solenoid Valve	Essential	5 053
67311-SV76	Solenoid Valve	Essential	5 054
67311-SV77	Solenoid Valve	Essential	5 055
67311-SV78	Solenoid Valve	Essential	5 056

3) ELECTRICAL COMPONENTS

Component ID	Description	Priority	Data Sheet
7311-LACM 1	LAC Fan Motor	Essential	5 058
7311-LACM 2	LAC Fan Motor	Essential	5 059
7311-LACM 3	LAC Fan Motor	Essential	5 060
7311-LACM 4	LAC Fan Motor	Essential	5 061
7311-LACM 5	LAC Fan Motor	Essential	5 062
7311-LACM 6	LAC Fan Motor	Essential	5 063
7311-LACM 7	LAC Fan Motor	Essential	5 064
7311-LACM 8	LAC Fan Motor	Essential	5 065
7311-LACM 9	LAC Fan Motor	Essential	5 066
7311-LACM 10	LAC Fan Motor	Essential	5 067
7311-LACM 11	LAC Fan Motor	Essential	5 068
7311-LACM 12	LAC Fan Motor	Essential	5 069
7311-LACM 13	LAC Fan Motor	Essential	5 070
7311-LACM 14	LAC Fan Motor	Essential	5 071
7311-LACM 15	LAC Fan Motor	Essential	5 072
7311-LACM 16	LAC Fan Motor	Essential	5 073
7311-LACM 17	LAC Fan Motor	Essential	5 0731
7311-LACM 18	LAC Fan Motor	Essential	5 074
7311-LACM 21	LAC Fan Motor	Essential	5 075
7311-LACM 22	LAC Fan Motor	Essential	5 076
7311-LACM 23	LAC Fan Motor	Essential	5 077
7311-LACM 24	LAC Fan Motor	Essential	5 078
7311-LACM 25	LAC Fan Motor	Essential	5 079
7311-LACM 26	LAC Fan Motor	Essential	5 080
7311-LACM 27	LAC Fan Motor	Essential	5 081
7311-LACM 28	LAC Fan Motor	Essential	5 082
7311-LACM 29	LAC Fan Motor	Essential	5 083
7311-LACM 30	LAC Fan Motor	Essential	5 084
7311-LACM 31	LAC Fan Motor	Essential	5 085
7311-LACM 32	LAC Fan Motor	Essential	5 086
7311-LACM 33	LAC Fan Motor	Essential	5 087
7311-LACM 34	LAC Fan Motor	Essential	5 088
7311-LACM 35	LAC Fan Motor	Essential	5 089

3) ELECTRICAL COMPONENTS (Continued)

Component ID	Description	Priority	Data Sheet
7311-LACM 36	LAC Fan Motor	Essential	5 090
7311-LACM 37	LAC Fan Motor	Essential	5 091

3431 - DOUSING SYSTEM

1) MECHANICAL COMPONENTS

Component ID	Description	Priority	Data Sheet
3431 PV-1	Air Operated Butterfly Valve	Essential	6 004
3431 PV-2	Air Operated Butterfly Valve	Essential	6 005
3431 PV-3	Air Operated Butterfly Valve	Essential	6 006
3431 PV-4	Air Operated Butterfly Valve	Essential	6 007
3431 PV-5	Air Operated Butterfly Valve	Essential	6 008
3431 PV-6	Air Operated Butterfly Valve	Essential	6 009
3431 PV-7	Air Operated Butterfly Valve	Essential	6 010
3431 PV-8	Air Operated Butterfly Valve	Essential	6 011
3431 PV-9	Air Operated Butterfly Valve	Essential	6 012
3431 PV-10	Air Operated Butterfly Valve	Essential	6 013
3431 PV-11	Air Operated Butterfly Valve	Essential	6 014
3431 PV-12	Air Operated Butterfly Valve	Essential	6 015

2) INSTRUMENT & CONTROL COMPONENTS

A) Electro-pneumatic Loops:

Component ID	Description	Priority	Data Sheet
63431 SV1N-1	Pilot Solenoid Valve	Essential	6 017
63431 SV1N-2	"	Essential	6 018
63431 NRV1N-1	Check Valve in Air Supply Line	Essential	6 019
63431 NRV1N-2	"	Essential	6 020
63431 SV2P-1	Pilot Solenoid Valve	Essential	6 021
63431 SV2P-2	"	Essential	6 022
63431 NRV2P-1	Check Valve in Air Supply Line	Essential	6 023

2) INSTRUMENT & CONTROL COMPONENTS (Continued)

A) Electro-pneumatic Loops: (Continued)

Component ID	Description	Priority	Data Sheet
63431 SV5P-1	Pilot Solenoid Valve	Essential	6 024
63431 SV5P-2	"	Essential	6 025
63431 NRV5P-1	Check Valve in Air Supply Line	Essential	6 026
63431 NRV5P-2	"	Essential	6 027
63431 SV6Q-1	Pilot Solenoid Valve	Essential	6 028
63431 SV6Q-2	"	Essential	6 029
63431 NRV6Q-1	Check Valve in Air Supply Line	Essential	6 030
63431 SV9Q-1	Pilot Solenoid Valve	Essential	6 031
63431 SV9Q-2	"	Essential	6 032
63431 NRV9Q-1	Check Valve in Air Supply Line	Essential	6 033
63431 NRV9Q-2	"	Essential	6 034
63431 SV10N-1	Pilot Solenoid Valve	Essential	6 035
63431 SV10N-2	"	Essential	6 036
63431 NRV10N-1	Check Valve in Air Supply Line	Essential	6 037

2) INSTRUMENT & CONTROL COMPONENTS (Continued)

B) Pneumatic Loops:

Component ID	Description	Priority	Data Sheet
63431 PV3Q-1	Pneumatic Pilot Valve	Essential	6 038
63431 PV3Q-2	"	Essential	6 039
63431 NRV3Q-1	Check Valve in Air Supply Line	Essential	6 040
63431 NRV3Q-2	"	Essential	6 041
63431 PV4N-1	Pneumatic Pilot Valve	Essential	6 042
63431 PV4N-2	"	Essential	6 043
63431 PV7N-1	"	Essential	6 044
63431 PV7N-2	"	Essential	6 045
63431 NRV7N-1	Check Valve in Air Supply Line	Essential	6 046
63431 NRV7N-2	"	Essential	6 047

2) INSTRUMENT & CONTROL COMPONENTS (Continued)

B) Pneumatic Loops: (Continued)

Component ID	Description	Priority	Data Sheet
63431 PV8P-1	Pneumatic Pilot Valve	Essential	6 048
63431 PV8P-2	"	Essential	6 049
63431 PV11P-1	Pneumatic Pilot Valve	Essential	6 050
63431 PV11P-2	"	Essential	6 051
63431 NRV11P-1	Check Valve in Air Supply Line	Essential	6 052
63431 NRV11P-2	"	Essential	6 053
63431 PV12G-1	Pneumatic Pilot Valve	Essential	6 054
63431 PV12G-2	"	Essential	6 055

73120 R/B VENTILATION SYSTEM

1) MECHANICAL COMPONENTS

Component ID	Description	Priority	Data Sheet
7312 PV-25	Air Operated Butterfly Damper	Desirable	7 003
7312 PV-26	Air Operated Butterfly Damper	Desirable	7 004
7312 PV-28	Air Operated Butterfly Damper	Desirable	7 005
7312 PV-29	Air Operated Butterfly Damper	Desirable	7 006
7312 DM-27	Manual Butterfly Damper	Desirable	7 007
7312 HCV-34	Fan Inlet Vane Damper	Desirable	7 008
7312 HCV-35	Fan Inlet Vane Damper	Desirable	7 009
7312 FR1	Exhaust Air Filtering Unit	Desirable	7 010
7312 F-1	Ventilation Exhaust Fan	Desirable	7 011
7312 F-2	Ventilation Exhaust Fan	Desirable	7 012

2) INSTRUMENT & CONTROL COMPONENTS

Component ID	Description	Priority	Data Sheet
67312 PV-25#1	Pneumatic Switching Valve	Desirable	7 014
67312 PV-25#2	Pneumatic Switching Valve	Desirable	7 015
67312 PV-26#1	Pneumatic Switching Valve	Desirable	7 016
67312 PV-26#2	Pneumatic Switching Valve	Desirable	7 017
67312 PV-28#1	Pneumatic Switching Valve	Desirable	7 018
67312 PV-28#2	Pneumatic Switching Valve	Desirable	7 019
67312 PV-29#1	Pneumatic Switching Valve	Desirable	7 020
67312 PV-29#2	Pneumatic Switching Valve	Desirable	7 021
67312 SV-25	Solenoid Valve	Desirable	7 022
67312 SV-26	Solenoid Valve	Desirable	7 023
67312 SV-28	Solenoid Valve	Desirable	7 024
67312 SV-29	Solenoid Valve	Desirable	7 025